were no significant differences between the two groups with respect to gender, age, and history of myocardial infarction. The test acceptance score (5, the best; 1, the worst) as perceived by the patients, was 2.0 ± 1.1 for the 3 min protocol and 1.8 ± 1.0 for the 6 min protocol (p = 0.08). Changes in SBP (−5 ± 19 vs −9 ± 19 mmHg) and DBP (−6 ± 10 vs −9 ± 11 mmHg) from baseline to the midpoint of ADEN infusion were not significantly different between the 3 min and 6 min protocols, but the HR increase was less for the 3 min than for the 6 min protocol (7 ± 13 vs 13 ± 13 bpm, p = 0.004). By SPECT imaging, the frequency of myocardial perfusion abnormalities (53% vs 48%) was similar for the 3 and the 6 min protocols. The sensitivity of myocardial SPECT for the detection of angiographic CAD was 89% (32 of 36) using the 3 min protocol and 96% (22 of 23) for the 6 min protocol (p = 0.36). Thus, myocardial SPECT with a 3 min ADEN infusion is feasible, slightly better tolerated, and as accurate for the identification of CAD as a standard 6 min infusion protocol.

1233-144 Delayed Recovery of Myocardial Perfusion in Acute Myocardial Infarction: A Scintigraphic Study After Early Thrombolytic Treatment

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Background: Assessment of jeopardized myocardium and infarct size early on after thrombolytic therapy in acute myocardial infarction (AMI) is important for risk stratification and for treatment management. We wanted to evaluate if myocardial perfusion scintigraphy with Tc-99m-sestamibi (MIBI-SPECT) could define the amount of viable vs. non-viable myocardium.

Methods: Seventy-one patients age 64 ± 9 years with AMI treated with thrombolysis were studied with two-day adenosine-stress and resting MIBI-SPECT 2–4 days after AMI. Comparison with resting MIBI-SPECT 6 months after AMI.

Results: All patients had significant perfusion defects compared to an age- and gender-matched, healthy reference population. Seventy-six % of the patients showed signs of reversible perfusion defects. Defect size (extent) and severity at rest decreased between 2–5 days and 6 months after AMI (p < 0.001). Reversible perfusion defects early on after AMI were not related to spontaneous improvement of myocardial perfusion 6 months later.

Conclusion: Myocardial perfusion scintigraphy with adenosine-stress and resting MIBI-SPECT early on after AMI underestimates myocardial viability in the majority of thrombolytic-treated patients. Neither reversible perfusion defects nor regional semi-quantitative perfusion data seems to predict spontaneous improvement of perfusion 6 months after AMI.

1233-145 Effect of Chamber Size on Accuracy of Dual Isotope Myocardial Perfusion SPECT

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Background: Previous work has suggested that the diagnostic accuracy of T1-201 myocardial perfusion SPECT is lower in pts with smaller LV chamber size. Since patients (pts) with small hearts and coronary artery disease (CAD) may be at higher risk, this inaccuracy could be of diagnostic and prognostic importance.

Methods: We studied 678 consecutive pts (mean age 64 ± 11 years old, 60% males) undergoing rest T1-201/gated stress Tc-99m sestamibi dual isotope myocardial perfusion SPECT (59% exercise, 41% adenosine) who either had low likelihood of CAD (n = 490) or underwent coronary angiography within 180 days after stress testing (n = 188). Pts with prior MI, CABG, or PTCA were excluded. Relative chamber size was determined by automatic analysis of end diastolic (ED) volume using the method of Germano et al. Pts were separated by median ED volume. Receiver operating characteristic (ROC) curves were generated for pts with large and small hearts and the area under each curve was calculated and compared.

Results: Accuracy in detecting CAD (≥50% stenosis) was equivalent in pts with large and small hearts (ROC area 0.90 vs. 0.90, p = ns). No significant differences were noted in sensitivity, specificity, or normalcy for large vs. small hearts.

Conclusion: Myocardial perfusion SPECT using Tc-99m sestamibi appears to be accurate irrespective of heart size, likely due in part to the high resolution of the radiopharmaceutical.

1233-146 Detection of Ischemia by Dobutamine Echocardiography and Sestamibi Imaging in Ischemic Cardiomyopathy

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Background: Although dobutamine echocardiography (DSE) is used to assess ischemia in patients with ischemic cardiomyopathy (ICM), little is known regarding its relationship with dobutamine sestamibi myocardial perfusion study (DSPI).

Methods: We performed simultaneous DSE (5–40 μg/kg/min ± atropine) and DSPI in 45 men and 9 women (65 ± 9 yrs) with ICM (mean EF 24%). Myocardial segments (sgs) were scored blindly and independently using a 16 segment model (total 864). DSE response was defined as biphasic (BP), worsening (W), no change (NC) or improvement (IMP).

Results: Among 68 sgs (8%) with normal wall motion (WM) at rest, ischemia by DSE (BP and/or W) was present in 14 sgs (21%) compared to 24 sgs (35%) by DSPI (agreement = 74%; K = 0.36 ± 0.13). Of 796 sgs with WM abnormalities at baseline, ischemia was seen in 65% by DSPI and in 33% by DSE (p < 0.001). The agreement was 44%, K = 0.02 ± 0.03 (Table).

	DSE			
DSPI	BP	W	NC	IMP
Ischemia	126	42	221	129
No ischemia	69	28	105	76

Conclusions: In pts with ICM in whom WM abnormalities at rest are common, scintigraphic ischemia is more frequent than DSE ischemia.

1233-147 Myocardial Stunting Detected by Exercise Gated SPECT Tl-201: A New Scintigraphic Marker of Severe Extensive CAD

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LVEF measurements from gated SPECT Tl-201 studies post exercise (P-Ex) and at rest (R) provide a unique opportunity to determine meaning of a drop in LVEF P-Ex versus R. We analyzed 763 consecutive studies: 70% males, 60% with known CAD, 35% prior MI, 52% prior revascularization, 19% (144) with subsequent coronary angiography (CORS) ≤ 60 days. SPECT studies were acquired beginning 10–15" P-Ex and 4 hrs later (R), using multi-headed detectors, weight-adjusted Tl-201 dosage, LEAP collimators, 8 frames/cycle, no beat rejection, and a commercially available software program (QGS®). All studies had ≥750,000 myocardial counts. Data were analyzed for LVEF, lung/heart (L/H) ratio from a 4" anterior planar image, transient ischemic dilation (TID), summed stress score (SSS) (20-segment model, each segment scored from 0 [normal] to 3 [severely abnormal]), scintigraphic criteria for high risk (HR) (greater than 1 of LAD or multi-vessel distribution ischemia or abnormal L/H ratio); and finding of multi-vessel CAD at CORS (+). Patients were divided into two groups:

A = P-Ex LVEF ≥10 points lower than R LVEF (n = 27); B = all others.

Findings:	Abn.L/H	TID	SSS >13	HR	CORS+
Group A	33%*	89%*	78%*	52%*	37%*
Group B	14%	24%	33%	25%	8%

*p < 0.05

Conclusions: A substantial (≥10 EF points) drop in LVEF post exercise, measured from gated SPECT Tl-201 scintigraphy, is uncommon, affecting 3.5% pts. in this series. When present, it correlates with extensive and severe CAD. Further studies are warranted to determine incremental diagnostic and prognostic value.

1233-148 Gated SPECT Radionuclide Angiography: What Is the Gain?

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Background: Gated planar radionuclide angiography (p1-RNA) is a well established technique for the assessment of left ventricular (LV) function. The semi-automated method of analysis shows good intra-observer and inter-observer variability. Variations in background activity and superimposition of adjacent structures influences LV measurements and hampers the assessment of regional wall motion.

Purpose of the Study: to determine whether gated SPECT RNA (sp-RNA) improves the detection of regional wall motion abnormalities without reducing the accuracy of LV measurements.

Methods: In 18 patients sp-RNA was performed after completion of routine p-RNA. Twelve patients were treated with cardiotoxic agents, 5 patients were known with a previous myocardial infarction, 1 patient was known with dilated cardiomyopathy. For sp-RNA a 3-head gamma camera was used. After filtering of data short, horizontal long and vertical long axes were reconstructed from 2 pixel thick transversal slices. SPECT EFs were assessed by applying a 35% threshold to a region containing the LV. On pl-RNA and sp-RNA studies regional wall motion (normal, hypo-, a- or dyskinesia) was visually assessed in 7 myocardial segments. For the assessment of intra- and inter observer variability sp-RNA EF measurements were performed twice by the same observer and once by a second observer.

Results: On pl-RNA wall motion abnormalities were observed in 12 segments (sgm). On a-RNA 15 sgm were considered abnormal. In 9 sgm abnormalities were considered more severe on sp-RNA than on pl-RNA. In the 12 patients treated with cardiotoxic agents no wall motion abnormalities were observed.

There was a linear relationship between pl-RNA and sp-RNA EF measurements ($y = x + 5.8$; $r = 0.83$; SEE = 8.0). The intra-, and inter-observer variabilities were 1.9% ± 2.8 and 3.2% ± 2.0% respectively.

Conclusion: sp-RNA is an accurate method for the assessment of LV function. The gain of SPECT in RNA is the improved detection of regional wall motion abnormalities.

1233-166 Dobutamine gated-SPECT, thallium-SPECT and Dobutamine Stress Echocardiography to Assess Myocardial Viability

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Aim: 1/ Accuracy of MIBI-Quantitative-Gated-SPECT (QG-SPECT) during dobutamine infusion, to assess myocardial viability determined by dobutamine stress echocardiography. 2/ Comparison of QG-SPECT data, LV volume, ejection fraction (LVEF), wall motion and thickening, with echocardiography and LV angiogram.

Methods: a double head rotated gamma camera (HELIX-ELSCINT with Cedars Sinai software) was used to perform QG-SPECT. 12 pts had myocardial viability studied by Thallium-SPECT and during dobutamine infusion (10 $\mu g.kg^{-1}.mn^{-1}$) by QG-SPECT and stress echocardiography (dobu-echo). 37 pts got QG-SPECT with echocardiography and coronary angiography.

Results: 1/ QG-SPECT overvalues basal LV volumes (diast. +12%, syst. +33%) and underrates LVEF (-20%). During dobutamine infusion, LVEF changes are well correlated with echocardiography data ($r = 0.88$). 2/ Kinetic abnormalities of LV angiograms are well detected by echocardiography (sens. 94%, spec. 87%). QG-SPECT detection accuracy is lower (sens = 92%, spec = 50%). 3/ QG -SPECT is better than thallium-SPECT to detect a myocardial viability in infarction area.

Viability diagnosis/dobu-echo	Sens.	Spec.	PPV	NPV
Basal + redistribution Tl-SPECT	25%	100%	100%	33%
Dobu-G-SPECT motion	88%	50%	78%	67%
Dobu-G-SPECT thickening	75%	75%	86%	60%

Conclusion: QG-SPECT is a quantitative automatic method. It is feasible during a dobutamine infusion. Dobutamine QG-SPECT is a new way to assess myocardial viability.

1234 Peripheral Artery Disease

Wednesday, April 1, 1998, 3:00 p.m.–5:00 p.m.
Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 4:00 p.m.–5:00 p.m.

1234-47 Association of Accelerated Atherosclerosis and Myocardial Hypertrophy With Systemic Lupus Erythematosus

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Background: Clinical evidence of premature vascular disease (stroke and myocardial infarction) has been reported in systemic lupus erythematosus (SLE) and antiphospholipid antibody syndrome (APLA) and has been attributed to an increase in conventional atherosclerosis risk factors and/or prednisone use.

Methods: Preclinical evidence of vascular and myocardial disease was evaluated using carotid and cardiac ultrasound in 18 patients with SLE and 4 with primary APLA and compared to findings in 44 control subjects matched for age (mean = 41 years), gender (100% female) and race and to the presence of risk factors.

Results: Patients were comparable to controls in blood pressure, total and HDL cholesterol, and smoking history but tended to be obese (body mass index 29.3 vs. 25.2 kg/m^2, $p \approx 0.05$). Prevalence of carotid plaque was higher in patients (41 vs 9%, $p < 0.005$) as was left ventricular (LV) mass adjusted for obesity (40.3 vs 31.6 $gm/m^{2.7}$, $p < 0.005$). Furthermore there were no differences between patients with and without plaque in conventional risk factors or use of prednisone. Plaque and/or LV hypertrophy was present in 5/7 patients with clinical cardiovascular disease.

Conclusions: Preclinical cardiovascular disease is very common in SLE and APLA and is not explained by traditional risk factors or steroid use, suggesting that inflammation *per se* may be of primary importance.

1234-48 Assessing Cardiac Risk of Vascular Surgery: A Simple Bayesian Model Using Clinical Markers and Results of Preoperative Dobutamine Echocardiography

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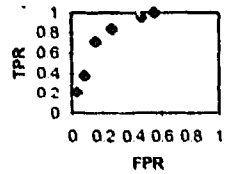
Background: We sought to validate a simple Bayesian model of assessing risk of postop cardiac death or MI in vascular surgery. We examined the use of dobutamine stress echo (DE) results to replace dipyridamole-thallium scintigraphy (DTHAL) as the diagnostic for computing a secondary risk score.

Methods: Data were collected for 340 patients (PTS) including clinical and stress test markers identified by L'Italien. A logistic model incorporated age >70 years, angina, history of MI, diabetes mellitus (DM), history of congestive heart failure (CHF) and prior revascularization to obtain clinical risk estimates. We added DE results (i.e. fixed and reversible wall motion and ST changes) to create a second logistic model. Comparison of observed and predicted estimates of cardiac events and receiver operating characteristics (ROC) curves were used to assess the models.

Results: The postop cardiac event rate was 7% (24/340). The event rate estimated from the clinical model was 5.6%; adding DE findings predicted an event rate of 7.4%. The observed event rate in PTS classified by clinical data as low (0–5%), moderate (>5–15%), or high risk (>15%) were 3.7%, 10.6%, and 14.3%. Adding DE results reclassified PTS from all categories, with the observed event rate in low, moderate or high risk PTS of 1.7%, 7.0% and 25.5%. The ROC curve (area >80%) for adverse event prediction using both models is shown indicating excellent discrimination.



Conclusion: We validated a Bayesian method for assessing cardiac risk in vascular surgery. The use of DE to replace DTHAL did not reduce the precision of the model. The clinical model is reliable in a majority of PTS; while DE can help to further refine risk prediction for specific clinical risk cohorts.

1234-49 Correlation Between pre and Intraoperative Myocardial Ischemia in Patients Undergoing Major Vascular Surgery Detected by Dobutamine Stress Echocardiography and Continuous 12-Lead Electrocardiography

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Aim of the Study: To compare myocardial ischemia detected preoperatively with dobutamine stress echocardiography (DSE) with intraoperative ischemia using continuous 12-lead ECG (Eli-100 ST) (ECG) monitoring in pts undergoing major vascular surgery.

Methods: DSE was used in 58 pts for the presence and location of stress induced ischemia (NWMA). ECG monitoring started 12 hr before up to 36 hr after surgery. In order to analyse the "ischemic burden" and location (anterior, lateral, inferior, and posterior), an algorithm was used for the detection and quantification of ischemic ST-episodes in each of the 12-leads ECG separately. Total ischemic burden was calculated as the total duration of ST-episodes (min) per pt and the summated areas (severity) under the curves of the 12-leads episodes (μV.min).

Results: ECG ischemia was preceded by a mean heart rate increment of 51%. DSE and ECG showed ischemia in 13/56 and 25/56 pts. The agreement